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China's "Double Deduction" Policy Brings Opportunities and Challenges to "Unconventional" Physics Experiments

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Abstract

Promoting the development of "unconventional" physics experiments plays an important role in the implementation of China's "double reduction" education policy, and using it as a lever can promote the continuous improvement of basic physics education. The article believes that under the background of the "double reduction" education policy, "unconventional" Physics experiments ushered in two major opportunities for development: policy support and the boost of a good educational environment; and after clarifying the impact of "unconventional" physics experiments on the "double reduction" education policy, leading education to return to life and improving students' interest in learning, etc. The value of the times in many aspects. The article explains how to promote the guidance of "unconventional" physics experiments to cultivate innovative physics teachers and explore the action logic of ecological physics teaching to ensure the effective implementation of China's "double reduction" education policy and realize the high-quality development of basic physics education.

Keywords

"Double reduction" policy, "unconventional" physics experiments, development opportunities, action logic

The "double reduction" policy, as the focus of the "burden reduction" reform in the compulsory education stage, was proposed in response to the long-standing and increasingly serious problem of "overburdened students" in the education process. However, in the implementation of the "double reduction" policy, there are also some difficult to reconcile value conflicts. Some studies have suggested that the "double reduction" may not reduce the burden of students and reduce the anxiety of parents, on the contrary, it will bring new group nature question (Huang Haiying & Zhang Le, 2022).

As a kind of educational science experiment, "unconventional" physics experiment has unique educational and teaching functions. Its experience embedding function and meaning association function (Zhang Wei, 2012) help students to use the accumulated experience in daily life to migrate, quickly master new knowledge, and apply The isolated pieces of knowledge are organically connected to truly "reduce the burden and improve the quality". Based on the background of the "double reduction" policy and based on the theory of "unconventional" physics experiments, this paper examines the opportunities and challenges brought by the "double reduction" policy to the development of physics education in my country, analyzes the trend and development strategies of physics teaching, and proposes to promote The path of students' core literacy is expected to provide a useful reference for middle school physics teaching under the background of the "double reduction" policy.

1. The "Double Deduction" Policy Provides New Opportunities for "Unconventional" Physics Experiments

Before the implementation of the "Double Reduction" policy, physics teaching generally had "emphasis on theory over experiment" and "emphasis on results over process", which made physics experiment teaching mostly superficial. The implementation of the "Double Deduction" policy enables students to have spare time to conduct experiments and explore independently, enhance students' enthusiasm for learning physics, and guide students towards the path of science.

1.1 The support of the "double reduction" policy is an important driving force for the development of "unconventional" physics experiments

The "double subtraction" policy requires that the students' previous learning methods have been changed from the source, so that students can learn more efficiently and independently, and on the premise of ensuring the quality of learning, the "addition" of all-round development and personality development should be done. According to the "Compulsory Education Physics Curriculum Standards" (2022 edition), "The compulsory education physics curriculum is an experiment-based natural science course, and schools should create as many opportunities for students as possible to conduct experiments, so as to give full play to the experimental education. Function to promote the development of students' core literacy. The "double reduction" policy gives students more time to experience "unconventional" physics experiments, which help to improve students' enthusiasm for learning, expand students' knowledge, and better Improve teaching efficiency. The integration of the "double reduction" policy and "unconventional" physics experiments will help us solve the problem of development quality caused by students' heavy academic burden.

1.2 A good educational environment is a catalyst for the development of "unconventional" physics experiments

Marx pointed out: "The environment plays a huge role in people's physical and mental development." The implementation of the "double reduction" policy has made the campus cultural environment harmonious and relaxed, and the psychological environment of teachers and students' interpersonal communication is closer and more harmonious, which is conducive to the formation of a good nurturing soft environment. "Unconventional" physics experiments are to use the physical properties of easily available objects and appliances in life, through innovative research and development and ingenious design, to make them show physical phenomena, and on this basis to guide students to explore the hidden laws. If we have the awareness and skills to develop the potential resources of experiments, it will help students to conduct physical experiments and explore and understand the laws of physics. For middle school students, resources from family, school and social life environment are diverse and easy to obtain, which objectively creates good material conditions for them to actively carry out experimental exploration activities. The implementation of the "double reduction" policy has opened up the channel between physics teaching and the real life world of students, and created a good educational environment for the development of "unconventional" physics experiments.

2. The era value of "unconventional" physical experiments under the background of "double subtraction"

The value orientation of "unconventional" physics experiments is based on ecological physics teaching and faces the broad social life (Zhang Wei & Guo Yuying, 2007). After the "double reduction" policy takes root, it frees students from heavy schoolwork and various "advanced" training, and guides education to return to the original intention, return to students, return to school, and return to family. This is consistent with the value orientation of the harmonious and healthy development of people's naturalness, sociality and autonomy proposed by the "unconventional" physics experiment teaching theory, and is helpful to understand and recognize the "double reduction" of carrying out "unconventional" physics experiments. The practical significance of policy implementation.

2.1 "Unconventional" physics experiments help education return to life after "double reduction"

The policy of "Double Reduction" takes "cultivating people by virtue" as the main line, and takes the protection of students' rights and interests and the promotion of healthy physical and mental development as the basic starting point, so that compulsory education can return to life and return to the "original intention" of virtue and cultivation of people. How to combine physical education with daily life organically? The author believes that it is necessary to build a bridge between daily life and physical knowledge, and the "unconventional" physical experiments based on life can just play

the role of this link. "Unconventional" physical experiment instruments are different from factory-made conventional experimental instruments. They are made from common daily necessities and waste materials of students, which conform to the students' existing cognitive structure and are close to the students' living environment. It requires the combination of physical education and social life, the use of hands and brains, and hard work in labor. These are all improvements to traditional education in which schools are separated from society and books are disconnected from life, which helps education return to life.

2.2 "Unconventional" physics experiments enhance students' interest in learning after "double subtraction"

"Unconventional" physics experiments can effectively enhance students' interest in learning, thereby stimulating students' needs for active cognition. Teachers create a physical learning situation with a new structure formed by materials familiar to students, so that students' original cognitive structure conflicts with the current reality, so that students have a strong desire to explore new knowledge, and their classroom performance is emotional excitement, Interested and highly focused. The reason for this effect lies in the unique "novel, strange and doubtful" of "unconventional" experimental teaching aids. The "new" here does not mean that the optical equipment has a gorgeous and exquisite appearance, but refers to the use of familiar living objects and materials to build a structure that is rarely seen in their life experience (including the incongruity with the teaching situation). For example, when there are daily objects and materials such as eggs, cans, beverage bottles, toys, etc. in the physics class, the inappropriate occasion will make the students very excited; "odd" means that the physical phenomena presented by the teaching aids are unexpected by the students , the experimental results are difficult for students to think of in advance, which can be said to be strange; "doubt" means that students can't use their existing knowledge to make scientific explanations for experimental phenomena. It is difficult to explain correctly until the student learns something new, and this is where the doubt lies. It can be seen that the unique "three elements" of "unconventional" physics experiments change the structure of the classroom from static and dynamic aspects, give students strong stimulation, and thus stimulate students' cognitive needs and interest in learning (Zhang Wei, 2003).

3. Action logic for "unconventional" physics experiments to effectively implement the "double reduction" policy

It is not accidental that the "double reduction" policy appeared in the current historical stage of education reform. It is necessary for us to analyze the deep-level action logic of "unconventional" physical experiments from the perspective of the "double reduction" policy, and find the inner connection between the two. In ecological physics teaching, students, teachers and curriculum resources influence each other, and it is emphasized that students' learning should be oriented by real social life and establish a direct connection with the real world, which is regarded as a factor in the teaching system.

3.1 "Unconventional" physics experiments cultivate innovative physics teachers after" double reduction"

The introduction of the "double reduction" policy is not only of great significance for optimizing the education ecology, but also brings a new direction for the professional development of teachers. As the main implementers of the "double reduction" policy, if teachers rest on their laurels and stand still, there will be an embarrassing situation in which their professional abilities cannot meet the diverse needs of students, resulting in teaching methods that cannot keep up with the pace of the times and lack innovation (Liu Jian, 2022). How to be an excellent physics teacher in the new situation? The author believes that "unconventional" physics experiments will help to cultivate innovative physics teachers needed after the "double reduction". "Unconventional" physics experiments are essentially borrowing potential courses in living environments that were not originally used for physics experiments. Resources to develop and design the teaching behavior of intentional physics experimental teaching activities. The process of carrying out this work is actually a process of innovation, which requires continuous divergent thinking and concentrated thinking, conscious use of the principles and methods of creativity and creative education, the principles and methods of physics and teaching theory, and flexible use of existing Knowledge and experience, skillfully use ecological environment resources to solve teaching problems (Zhang Wei & Guo Yuying, 2007). Therefore, the training of "unconventional" physical experiment skills for physics teachers is conducive to cultivating pioneering and innovative basic physics teachers (Liu Yansong & Zhang Wei, 2009).

3.2 "Unconventional" physics experiments explore "double subtraction" post-ecological physics teaching

The heavy schoolwork burden of students is caused by the imbalance of the educational ecology, and the emphasis on screening and neglect of growth in the compulsory education stage is the main factor causing the imbalance of the educational ecology. My country's middle school curriculum reform is in a critical period and a deep-water area. In this critical period, how to ensure the healthy and happy development of students? To achieve this goal, the key is to reconstruct the educational ecology required to ensure the all-round development of students. Therefore, it is necessary to explore new teaching methods and construct ecological physics teaching that is conducive to the healthy growth of students. The "unconventional" physics experiment teaching design is based on the concept of ecological physics teaching. It is an experimental teaching design that reflects the basic characteristics of ecological physics teaching, and can effectively deal with the problem of educational ecological imbalance. The ecological physics teaching process design, with the physical environment and social environment as the background, organizes and arranges various elements in the teaching system from the perspective of wholeness, balance, harmony and unity, connection, dynamics and openness, and focuses on creating students with real problems or task situations. Familiar learning environment, organize learning activities in a variety of ways to conduct overall evaluation of learning results (Zhang Wei & Guo Yuying, 2006). The proper use of "unconventional" physics experiment teaching will help to reshape the good ecology of basic education, promote the all-round development and healthy growth of students, and effectively implement the educational purpose of creating new talents of the times (Ma Luting & Zheng Xuewen, 2022).

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